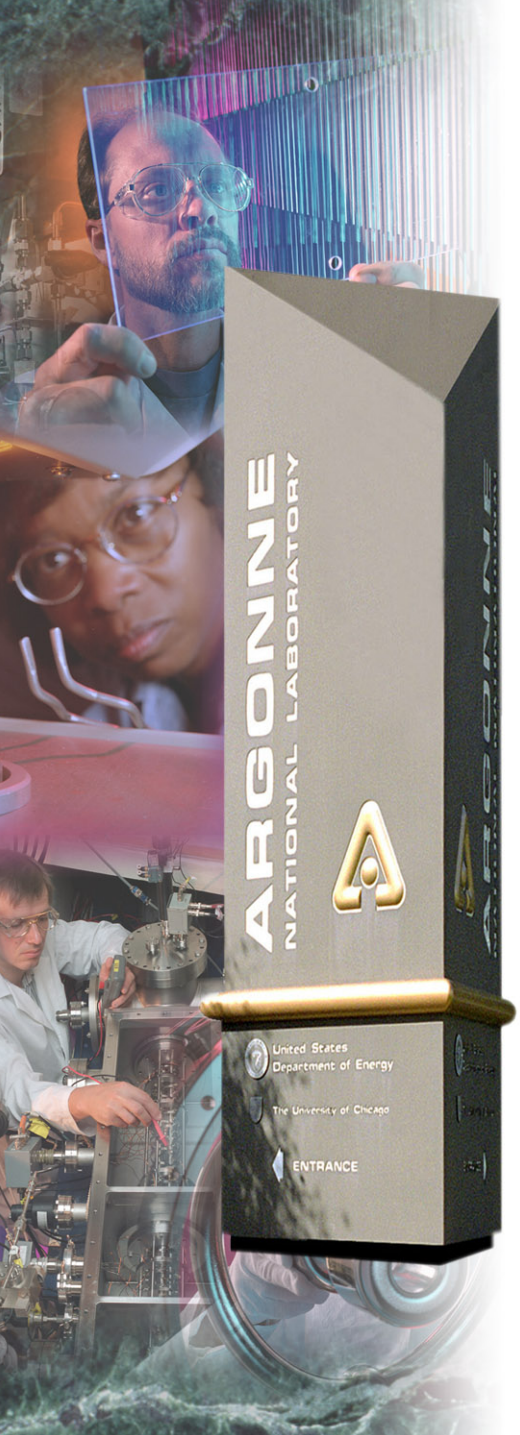

IT Vision for Computing at the APS

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Argonne National Laboratory

Office of Science
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IT Mission Statement

- The mission of the IT Group is to provide the staff of the APS access to the latest computer technology for the purpose of enhancing the operation of the APS and furthering the goals set by the APS management.

IT Responsibilities (1)

- Support the APS Accelerator Control System
- Support the XOR Beamlines
- Set up, maintain and support the APS computer infrastructure including managing all APS Enterprise networks and CAT backbone networks, managing all firewalls, managing computer servers, managing printers, performing tape backups, supporting all Laboratory cyber security policies, managing APS-wide e-mail and various Internet access tools.

IT Responsibilities (2)

- Provide technical support to the Divisions in the planning and acquisition of computer and related supplies and equipment.
- Provide support for the staff in use of the tools and technology to be effective and efficient in their work.
- Provide hardware support for all central systems and local support for all desktop computers.
- Provide software support, including installation for software applications, Internet and other network access tools, peripherals drivers, and updates.

IT Responsibilities (3)

- Provide troubleshooting using diagnostic tools to check out hardware and software problems, preventing, detecting and removing computer viruses.
- Provide hardware maintenance and servicing. including preventative maintenance, diagnosing problems, repair, replacement, sending machines out for service, maintaining an inventory of standardized spare parts and systems.
- Provide general support for remote access. Installation of remote access software and troubleshooting

IT Responsibilities (4)

- Provide selection of standard computing hardware and software.
- Provide data backup on all (non-portable) computers used by APS employees. Backup service for CAT data files is by explicit written agreement only.
- Provide cyber security measures for all APS computers.
- Record service calls made via Helpdesk in order to record initial requests, track actions taken, indicate completion of problems and log effort required and successful resolutions.

Where APS IT is Today

SUPPORTED PLATFORMS

- 800 Windows PCs
- 220 Macintosh
- 400 Sun Workstations
- 95 Linux
- 250 Printers
- 3 Terminal Servers
- 50 Cisco Catalyst Routers & Switches
- 10 Enterasys Switches
- 94 Wireless Access points
- 3000 Network Nodes

SERVER CLUSTERS (1)

Clustering Features

- High levels of service availability (resiliency against failures)
- Enables both scaling of applications and services
  - Horizontal scaling by adding new servers to the cluster
  - Vertical scaling by increasing the size of current servers in the cluster.
- Simplifies management of multiple systems
- Resource utilization is much more effective and efficient
- Overall risk reduction and investment protection (from downtime costs)

SERVER CLUSTERS (2)

Solaris Clusters

- Accelerator Control Servers Helios and Selene
- Central Computing Servers Oxygen and Ozone
- Oracle Database Servers Ra and Bast
- E-mail Server Atlas

Windows Cluster

- Nickel Z: drive
- Print Services

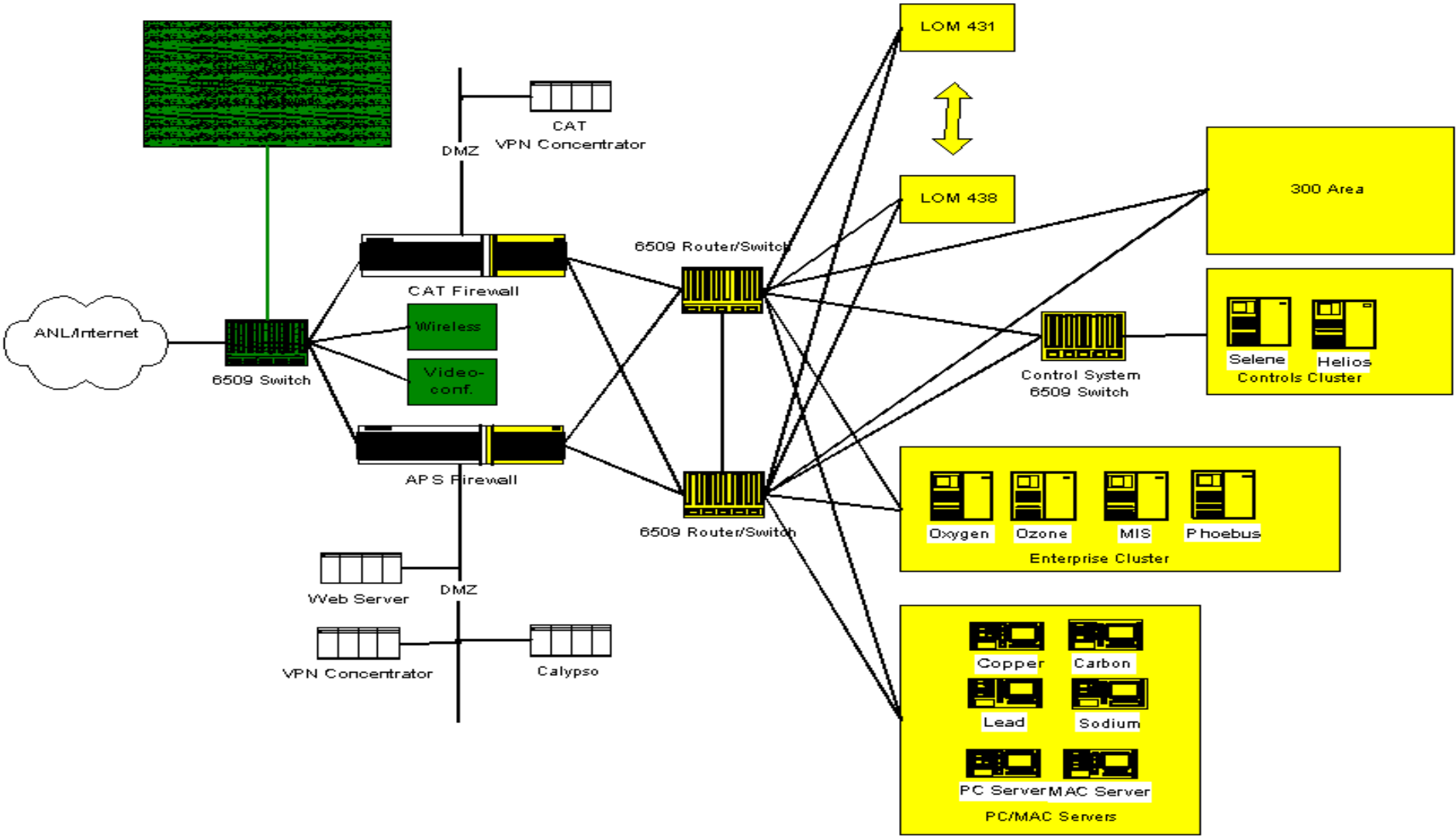
Networking

Wireless

- 802.11b (11 Mbps)
- CLO
- Experiment Hall
- Auditorium
- LOM's

Network Core Switch/Routing

- 720 Gbps Supervisors
- Bandwidth Available for Streaming Video
- 10 Gigabit Ready
- Fully Redundant


LOM 431
LOM 438
300 Area
DMZ
CAT
VPN Concentrator
CAT Firewall
6509 Router/Switch
ANL/Internet
6509 Switch
Wireless
Video-
conf.
Selene
Helios
Controls Cluster
Control System
6509 Switch
APS Firewall
6509 Router/Switch
Oxygen
Ozone
MIS
Phoebus
Enterprise Cluster
Web Server
DMZ
VPN Concentrator
Calypso
Copper
Carbon
Lead
Sodium
PC Server
MAC Server
PC/MAC Servers

APS Network

Cyber security (1)

- Firewalls Scans Email, HTTP, FTP for Viruses
- McAfee Anti-virus on All PC Window Servers and Desktops
- Portal Server https://calypso.aps.anl.gov
  - For offsite access to email and files
- VPN - APS and CATS
  - For offsite access from home and laptops

Cyber security (2)

- **Spam Assassins on APS Firewall (2/12/04)**
  - Processed 9952 messages
  - Detected 2169 messages as Spam
  - Firewall found 17 messages with viruses
- **Spam Assassins on CAT Firewall (2/12/04)**
  - Processed 3533 messages
  - Spam Assassin detected 766 messages as spam
  - Firewall found 113 messages with viruses

IT Vision for Computing

- To provide the best information technology services through the effective utilization of existing and new technology. IT will implement and support technologies and processes that will increase service and enhance staff productivity.

New Initiatives (1)

- **Portal Servers v 6.1**
  - Portals provide secure access to select application such as Email, Intranet Web, and File Access.
  - Integrates with Tarantella. Tarantella delivers complete web-based access to server-based applications running on Microsoft Windows, UNIX, or Linux.

- **Provide Single Sign-on with SunONE Directory Server for the following services and computers:**
  - Email
  - Macintosh computers
  - Solaris clients workstations of phoebus, helios, and oxygen
  - Portal server
  - Linux computers

New Initiatives (2)

- Streaming Video servers for delivering live or prerecorded content such as conferences or training in real time over the Internet.

- Next Generation Firewalls to Improve Network Performance and add High-Availability to minimize potential for single point of failure.

- New Intrusion Detection hardware to accurately identify and classify know and unknown threats targeting the network, including worms, denial-of-service (DoS), and application attacks. Automatically adds blocks to new Firewall.

New Initiatives (3)

- New Citrix Metaframe Servers accessible via Web or existing Metaframe client software. Provides access to administrative application for Unix, Mac, and Windows PC's.
  - Internal URL: http://metis.aps.anl.gov
  - External URL: https://metis.aps.anl.gov

- Cyclades Terminal Servers for Server and IOC consoles
  - Supports SSH (Encrypted Session)
  - Embedded Linux

New Initiatives (4)

- Wireless
  - 802.11g (54 and 11 Mbps)
  - EAA
  - RF Building 420
  - Linac
  - LEUTL
  - Argonne Guest House

Accelerator Controls (1)

- **Multiple Virtual Local Area Networks (VLANs)**
  - Real time Control for existing control system
  - Bulk Data for new applications and hardware
    - *Streaming Video servers*
    - *Smart Controllers*

- **Network Attached Devices Increasing**
  - 40 or 80 new nodes for BPM's
  - 200- 400 Smart Controllers for Power Supplies
  - Intelligent Instruments - Oscilloscopes

Accelerator Controls (2)

- **New Operating Systems in the Computing Environment**
  - Solaris (existing)
  - Linux
  - MacOS
- **Gigabit Ethernet for IOC's**

Beamline support

- New Computers are Running Linux Operating System
- Standardization of Computer Hardware and Configuration Management to Comply with Laboratory Cybersecurity Policies
- Terminal Servers Consoles for Beamlines IOC's
- Telepresence for Remote Access to Beamlines
- Central Data Archiving
- Robotic DVD Writers and Jukebox

IT Improvements

- Reduce Help Desk Request Response Time
- Improve PC Windows Administration by Automating Many of the Day-to-Day Operations such as Application Installations and Upgrades
- Bring Linux Support up to the Same Level of Support as Solaris
- Email Suggestions to kvs@aps.anl.gov

CIS Vision for ANL Computing

ANL IT Architecture

National User Facility Operations Data - (Page 16)

- Details
  - National user facilities operate scientific machines such as particle accelerators for the benefit of a user community of scientists and engineers. These facilities maintain logs of facility/machine operations including settings, parameters, and events. As with any facility/machine, maintenance records must be maintained. All of these activities rely on documentation and supporting references about the facility/machine.
- CIS Actions to Implement
  - Work with national user facilities to document and maintain their operational data dictionaries.
  - Identify data stewards for operational data.
  - Create and execute a plan to separate transactional processing systems from decision support systems where appropriate.
  - Create an ANL data warehouse for operations. Offer it as a service to national user facilities to store, protect, and catalog their data.

CIS Vision for ANL Computing

ANL IT Architecture

Engineering Data - (Page 15)

- Details
  - Engineering projects are initiated when a problem or need is identified. The requirements and goals are analyzed leading to a preliminary design. From the preliminary design, a prototype is constructed and tested. If the prototype passes the tests, it is implemented or put into production. If the prototype does not pass the tests, it is analyzed, reworked, and retested until it does pass the tests. Each step in this process produces data and design documents that are associated with the engineered product and must be managed and tracked.
- CIS Actions to Implement
  - Create and maintain a searchable catalog of division-generated electronics designs and research reports. Make this available to the rest of the Lab. Define standard file formats to promote interoperability and reuse of engineering data and designs.
  - Create an ANL data warehouse for operations. Offer it as a service to scientific and engineering divisions to store, protect, and catalog their data.

Conclusion

- World Class Accelerator Requires World Class Computing and Networking Environment to Operate at its Highest Potential
- IT Hardware and Software Requests from APS Groups and CAT'S Exceeds Budget of the IT Group
- APS Management and the IT Group must decide which Projects and Equipment are Worth Investing in to Maximize Return on Investment